CUNDALL

OCTOBER 2009

Moore College

Electrical Infrastructure Review

Prepared for

ALLEN JACK+COTTIER

Prepared by

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A	Issued for comment	24.07.09
B	Updated issue for Development Approval	12.10.09
C	Updated for Project Application and Concept Plan	3.11.09

The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.

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Introduction

Cundall have been appointed to undertake an Electrical Infrastructure Review of the Moore College campus in Newtown, Sydney. The campus is located on the Junction of Carillon Avenue and King Street and is comprised of academic, commercial and residential properties. The development consists of multiple titles, land packages and buildings that are separated by the existing road network of Carillon Avenue, King Street, Little Queen Street and Campbell Street.

The Master Plan exercise being undertaken by Allen Jack + Cottier Architects is looking at the staged redevelopment of the Moore College campus over an as yet undetermined period of time. The current focus of the project is to assess the current and future needs of the college in terms of academic uses including a new library, residential accommodation for both staff and students and to incorporate ancillary facilities such as dining and kitchen areas and a provision of onsite car parking.

This report has been put together using a staging programme and schedule of accommodation outlined over 10-15 years which incorporates all current/future usages listed above. The master plan also looks to complete a land swap with University of Sydney and a consolidation of existing land titles as part of the overall programme.

From the information received Cundall have set out a schedule of tasks that highlight the electrical and communications infrastructure works to be completed over each of the defined stages. The following design works/investigations have been listed to achieve this:

- Obtain Dial Before You Dig (DBYD) records from local utility companies.
- Obtain existing site infrastructure records/details of completed on site surveys
- Obtain proposed development master plan staging and time scales
- Prepare load schedule including existing and proposed loads against defined staging
- Attend site and review building infrastructure assets and locations.
- Preparation of report and findings
- Contact local Electricity Company (Energy Australia) and Telecommunications Provider (if required) to advise on infrastructure costs associated with earliest work stages.

Dial Before You Dig (DBYD)

The following DBYD asset information was obtained detailing the services in and around the development area. The search included gas and water services asset information which was reviewed and has been listed below; however this does not form part of this investigation or appointment. The documents highlighted in *italics* were consulted and used as part of this review:

DBYD Sequence No.	Utility	Asset Owner	Contact No	Status
15655480	Traffic signals	Roads & Traffic Authority #	0288370890	-
15655487	*Comms*	*Verizon Business*	*0294345000*	*Responded*
15655478	*Telecomms*	*Visionstream, Ncc - NSW*	*1800336886*	*Responded*
15655484	*Telecomms*	*AAPT / PowerTel, NSW*	*0282643932*	*Responded*
15655483	Rail	RailCorp Metro South **	0297528204	-
15655489	*Telecomms*	*PIPE Networks, NSW*	*0732339800*	*Responded*
15655485	*Electricity*	*Energy Australia, Eastern*	*0249510899*	*Responded*
15655481	*Telecomms*	*Telstra, Newtown*	*1800114918*	*Responded*
15655488	*Telecomms*	*Optus Networks, NSW*	*1800505777*	*Responded*
15655486	Gas	Jemena Gas South	1300880906	Responded
15655482	Water	Sydney Water	0293506744	Responded
15655479	*Telecomms*	*Primus Telecom, NSW*	*0399233562*	*Responded*

Existing Site Infrastructure

The following items were highlighted during our site asset survey and from a review of available documentation. The building infrastructure described below covers buildings that are affected directly by any master plan and works staging. The wording below does not discuss the staging of each building specifically but does highlight in *italics* key items of note.

The below findings have been summarised on a site plan drawing in Appendix B of this report.

- The local LV network is principally distributed via overhead cabling in King Street and Carillon Avenue. The overhead cabling is on the north side of King Street adjacent to the site boundary. On Carillon Avenue the overhead cabling is on the opposite side bordering MooreCollege site.

- Supply to 1 King Street (200Amp 3 phase) – The supply to this building is derived from the overhead cabling on the north side of Carillon Avenue. As part of the demolition and removal of this building the supply can be safely removed and does not affect other works.

- The main campus communications hub is located within 1 King Street. The server room is located on the top floor of the building with a data rack position and intake position located on the ground floor facing Carillon Avenue. From these locations IT/Data infrastructure is reticulated to several other buildings on the site. The highlighted existing infrastructure plan indicates the known reticulation of communications infrastructure around the campus with key nodes marked.

  Note: The main communications fibre/telephone service provider for Moore College is provided directly from Sydney University campus located behind Moore College. The cabling infrastructure is reticulated through St Paul's College Building and then below ground in a dedicated conduit into 1 King Street server room.

- Broughton Knox Teaching Centre (400/200Amp 3 phase) – The main supply terminates in an electrical riser to the rear of the building. The cable is reticulated below the ground floor slab from the overhead cabling network on King Street. The supply cable appears to be taken from a pole located immediately adjacent to the building as noted in photo 1. The Broughton Knox Building is to be retained as existing in the Master Plan and as such the electrical supply should remain unaffected.

- The communications link to the Broughton Knox building is taken from 1 King Street via an overground/underground cabling route as indicated indicatively on the infrastructure plan. Any works to 1 King Street or 2-16 Carillon Avenue will affect the communications supply to this building.

- Moore Books – The book shop is supplied directly from the overhead network in King Street.

- A communications link is provided to the Book Shop from I King Street. Any works to 1 King Street or 2-16 Carillon Avenue will affect the communications supply to this building.

- 27-31 King Street – These buildings area supplied directly from the overhead network in King Street. The supply terminates in the main entrance at high level and includes a Telstra supply and meter for Telstra equipment installed within the building.

  A communications link is provided to the Book Shop from 1 King Street. Any works to 1 King Street or 2-16 Carillon Avenue will affect the communications supply to this building.

- 27-29 King Street – A separate Telstra supply is provided to the building as noted above. This is derived from the overhead cabling located in King Street

- 2-16 Carillon Avenue (200Amp 3phase) – The supply is derived from the overhead cabling on the north side of Carillon Avenue. It terminates in the under croft where the buildings change in level. The main switchgear in this location appears to supply all of 2-16 although it was not clearly marked.

- 2-16 Carillon Avenue– A Telstra network service is shown entering the building at ground floor level, the termination point of this service was not found during our survey.

- 2-16 Carillon Avenue (Communications) – The communications link from 1 King Street is reticulated through 2-16 and serves the building before leaving the building below ground to serve Broughton Knox and other buildings.

- Mary Andrews College/Residence – The main supply cable to these buildings is terminated in the under stairs cupboard within the residence building. The supply is derived from the overhead cabling network and supply post located at the junction of Campbell and Little Queen Street.

- Mary Andrews College/Residence – A Telstra network service is shown entering the building at ground floor level, the termination point of this service was not found during our survey.

- Mary Andrews College/Residence (Communications) – The buildings area supplied from the same communications hub located in 1 King Street. The cabling to this building is reticulated through 2-16 Carillon then across into the residence building.

- 38-44 Carillon Avenue – The residential houses are supplied from the rear from the overhead network in Campbell Street. The cable is taken from the local post underground to each building in turn.

- 38-44 Carillon Avenue (Communications) - A separate link has been provided to serve the residential houses directly

- 86-84 Campbell St – The existing sites are currently used as a workshop and are vacant. The workshop is supplied from the overhead network in Campbell Street.

- 86-84 Campbell St – If a telecommunications supply is taken into 86 Campbell Street then this will be derived from the existing below ground Telstra pit and conduit system in the adjacent street.

- Little Queen Street Residential Properties – Each property in the street is supplied from the overhead cabling reticulated along the street from the pole at the junction with Campbell Street.

- Little Queen Street Residential Properties – The telecommunications supply to each property is from a Telstra pit and conduit system reticulated down both sides of the street.

- Little Queen Street Residential Properties (Communications) – The Moore College internal communications cabling is reticulated into several of the Little Queen Street properties and cross the street from the rear of 29 King Street to serve the IT department in 43 King Street.

- Moore College – The college buildings are supplied from the overhead network in Carillon Avenue. There are 2 supplies serving the college buildings. The first is derived in Carillon Avenue and supplies the Staff Houses 3 and 1A and the adjacent Chapel.

  The second supply to Moore College is overhead taken from a pole on the junction with City Road/King Street and supplies the singles residence only; 1 Carillon Avenue.

- Moore College – The local Telstra network distributes along the north side of Carillon Avenue and has below ground connections into both 3 and 1 Carillon Avenue.

- Moore College (Communications) – The communications supply from Sydney University enters the building from the rear and is reticulated through 1 into 3 Carillon Avenue. The cabling then crosses the street in a dedicated pit and conduit run into 1 King Street server room.

Master Plan Staging / Electrical Infrastructure

Cundall have taken the latest staging plan provided by Allen Jack + Cottier as detailed below and have made assumptions based upon areas of new development provided previously. Drawing S9045/SK/E02 REV B indicates the latest information; see Appendix C

Based upon the agreed staging and areas schedule provided a load assessment has been completed that includes an estimated maximum demand figure for the existing development in each of these future stages. The load do not take account of the different titles and existing electrical supplies/meters within these stages but groups then as a comparison to the new stages. The load assessment is detailed in Appendix A of this report and includes the latest load assessment for the main 1 King street development submissions which has been highlighted separately.

We have detailed below key load staging and have high light the following:

- Existing Electrical Supplies – It is noted from our survey that all buildings with 2 exceptions on the development are independently served from the local low voltage network.
- There are no HV infrastructure or substation/kiosk locations affected by the proposed works.
- For works to commence to 1 King Street the supply will need to be removed. It is estimated that this will not be required for Stage 1 as the boundary line shown does not appear to affect this building. It is recommended that the new kiosk substation is established prior the commencement of the new works that required this over head supply to be removed.
- For Stage 1, 3 and 4 works to commence the 1 King Street supply and 2-16 Carillon supply will be removed as noted above and the new works shall be served from the new kiosk substation.

Stage 1 – A new 1000kVA transformer will be required to serve the estimated 3,500m^2 of academic facility. The load for this transformer has been calculated to include for stages 3 and 4. Provision will be made at this stage for an availability of 240kVA from this transformer with future provision up to an estimated maximum demand figure of 620kVA for all 3 areas.

Stage 2 – A new low voltage supply can be derived from the over head network in Carillon Avenue rated at 100 Amps. The supply will be split within the building to provide independent metering to each apartment.

Stage 2a – A new low voltage supply can be derived from the over head network in Campbell Street rated at 100 Amps. The supply will be split within the building to provide independent metering to each apartment.

Stage 3 – The envisaged load for Stage 3 is 212kVA. This has been accounted for in the Stage 1 new substation/Kiosk works. At this stage an increased in availability from Energy Australia will be required.

Stage 4 – The envisaged load for Stage 4 is 168kVA. This has been accounted for in the Stage 1 new substation/Kiosk works. At this stage an increased in availability from Energy Australia will be required.

Stage 5 – A new 500kVA transformer will be required to serve the Stage 5 academic facility, kitchens and residential. The substation/kiosk is a size that could be pole mounted in Carillon Avenue or located in a kiosk at the site boundary. Within the building the supply will be split within the building to provide independent metering to each apartment.

Stage 6 – A new low voltage supply can be derived from the over head network in Carillon Avenue rated at 100 Amps. The supply will be split within the building to provide independent metering to each apartment.

Stage 6A – A new low voltage supply can be derived from the over head network in Carillon Avenue rated at 300 Amps. The supply will be split within the building to provide independent metering to each apartment.

Stage 7 – A new low voltage supply can be derived from the over head network in Carillon Avenue rated at 100 Amps. The supply will be split within the building to provide independent metering to each apartment.

Based upon the current development application the above supply assessment includes for electrical usage that is subject to review and discussion with Energy Australia for each stage of the application and each stage of development work. It is recommended that each electrical application is reviewed and re-submitted as each building design is developed together with the mechanical services heating, cooling and ventilations strategies for those stages of work.

Action Items

1. Application lodged with Energy Australia for Stage 1 project works. Includes Stages 1, 3 and 4 total loads requested as part of Stage 1 works. Allowance for new Kiosk Substation with Stage 1 works. (Costs awaited)
2. Obtain budget quotations from Energy Australia for further stages of works. (Outstanding)
3. Review impact of relocating communications supply from Sydney University supplied through 1 Carillon Avenue.
4. Update electricity application at detailed design stage for Stage 1 and subsequent stage works.

Appendix A – Maximum Demand Calculation – Summary Table

	Description	Area m^2		Lighting (VA/m^2)	Small Power (VA/m^2)	Mechanical Equipment (VA/m^2)	Max Demand for Existing Areas (KVA)	Max Demand for Proposed Areas (KVA)	Comments
	Stage 1 - Academic/Teaching								
	Existing								
	1 King Street - Administration	1000		12	15	60	91.6		
	3-11 King St Residential	300		5	15	10	9.5		Gas heating, localised mechanical vent
	Proposed								
	Academic/Teaching	3345		8	15	40		221.8	Gas Heating and Electric Cooling / Mechanical vent
	Carpark (40 Spaces)	850		5		15		17.9	Mechanical Ventilation
	ENERGY AUSTRALIA APPLICATION - STAGE 1 LOAD							**239.7**	**KVA**
	Stage 2 - Residential								
	Existing								
	Residential	400		5	15	10	12.6		Gas heating, localised mechanical vent
	Proposed								
	Residential	2000		5	15	10		63.2	Gas heating and localised mechanical ventilation
	Carpark	2000		5		15		42.1	Mechanical Ventilation
	Stage 2a - Residential								
	Existing								
	Residential	400		5	15	10	12.6		Gas heating, localised mechanical vent
	Proposed								
	Residential	1600		5	15	10		50.5	Gas heating and localised mechanical ventilation
	Stage 3 - Academic/Teaching								
	Existing								
	Inc Stage 1 above								Inc Stage 1 above
	Proposed								
	Academic/Teaching	2900		8	15	40		192.3	Gas Heating and Electric Cooling / Mechanical vent
	Carpark	940		5		15		19.8	Mechanical Ventilation
	ENERGY AUSTRALIA APPLICATION - STAGE 3 LOAD							**212.1**	**KVA**

	Description	Area m^2		Lighting (VA/m^2)	Small Power (VA/m^2)	Mechanical Equipment (VA/m^2)	Max Demand for Existing Areas (KVA)	Max Demand for Proposed Areas (KVA)	Comments
	Stage 4 - Academic/Teaching								
	Existing								
	Inc Stage 1 above								Inc Stage 1 above
	Proposed								
	Academic/Teaching	1782		8	15	40		118.2	Gas Heating and Electric Cooling / Mechanical vent
	Carpark	2345		5		15		49.4	Mechanical Ventilation
	ENERGY AUSTRALIA APPLICATION - STAGE 4 LOAD							**167.5**	**KVA**
	Stage 5- Residential								
	Existing								
	Residential	2430		5	15	10	76.7		Gas heating, localised mechanical vent
	Dining Room	250		10	15	15	10.5		Electric heating
	Teaching /Academic	320		15		20	11.8		Gas heating, localised cooling
	Kitchen	370		10	100	60	66.2		Mechanical ventilation/Kitchen equipment loads
	Proposed								
	Residential	2000		5	15	10		63.2	Gas heating and localised mechanical ventilation
	Teaching /Academic	1600		8	15	40		106.1	Gas Heating and Electric Cooling / Mechanical vent
	Dining/Kitchen	900		10	100	40		142.1	Mechanical ventilation/Kitchen equipment loads
	Stage 6a - Residential								
	Existing								
	Residential	840		5	15	10	26.5		Gas heating, localised mechanical vent
	Proposed								
	Residential	4500		5	15	10		142.1	Gas heating and localised mechanical ventilation
	Carpark (60 Cars)	2000		5		15		42.1	Mechanical Ventilation
	Stage 6b - Academic/Teaching								
	Existing								
	Offices	430		15	25	25	29.4		Gas heating, localised cooling
	Garage	357		10	50	10	26.3		Gas/electric heating, electric equipment loads
	Residential	614		5	15	10	19.4		Gas heating, localised mechanical vent

	Description	Area m^2		Lighting (VA/m^2)	Small Power (VA/m^2)	Mechanical Equipment (VA/m^2)	Max Demand for Existing Areas (KVA)	Max Demand for Proposed Areas (KVA)	Comments
	Proposed								
	Teaching /Academic	1822		8	25	40		140.0	Gas Heating and Electric Cooling / Mechanical vent
	Stage 7 - Residential								
	Existing								
	Child Care Centre (Uni Syd)	280		12	10	40	18.3		Gas heating, localised mechanical vent
	Proposed								
	Residential	2115		5	15	10		66.8	Gas heating and localised mechanical ventilation
	Carpark (60 Cars)	2000		5		15		42.1	Mechanical Ventilation
	STAGES 1, 3 AND 4 MAXIMUM DEMAND (NEW KIOSK SUBSTATION - ENERGY AUSTRALIA STAGE 1 APPLICATION)							**619.4**	**KVA**
	TOTAL MAXIMUM DEMANDS (EXISTING AND NEW)						**393**	**1520**	**KVA**

Appendix B – Site Infrastructure Photo Key Plan

1. **Underground supply from Overhead LV Infrastructure to Broughton Knox Theatre.**

2. **Overhead supply cabling along King Street boundary**

3. Moores Books – Incoming Supply

4. 1 King Street Existing Incoming Electrical & Telstra Supply Point

5. 2-16 Carillon Avenue Incoming Electrical Supply

6. Campbell/Little Queen Intersection – View North on Little Queen

View West on Campbell Street

View South on Little Queen

View East towards Mary Andrews College

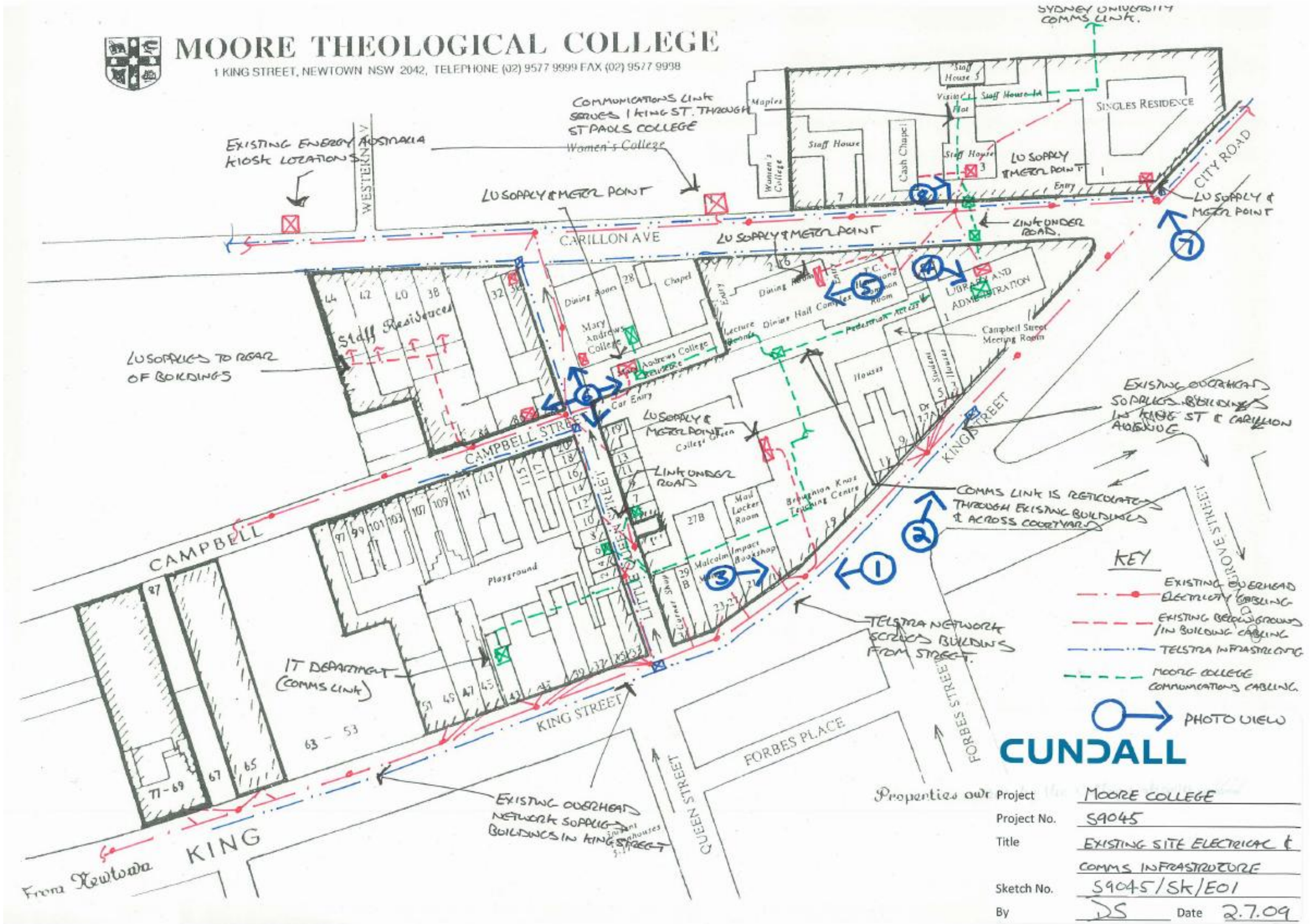
7. Moore College Overhead Supply Point

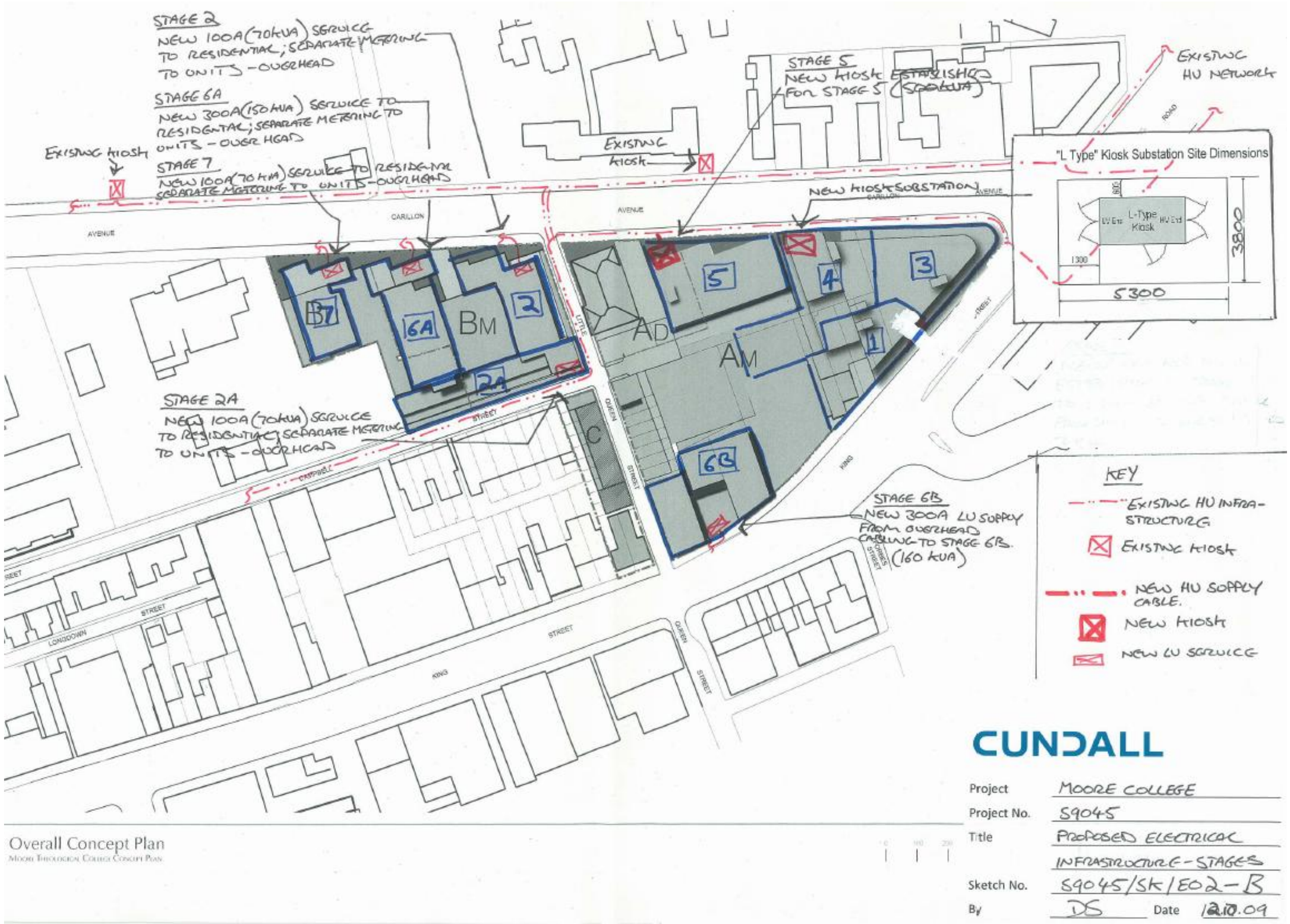
8. Staff House – 3 Carillon Avenue

Appendix C – Existing and Proposed Site Infrastructure

Drg S9045/SK/E01 – Existing Site Electrical & Communications Infrastructure

Drg S9045/SK/E02_rev B – Proposed Electrical Infrastructure – Stages


MOORE THEOLOGICAL COLLEGE
1 KING STREET, NEWTOWN NSW 2042, TELEPHONE (02) 9577 9999 FAX (02) 9577 9998
SYDNEY UNIVERSITY COMMS LINK.
COMMUNICATIONS LINK SERVES 1 KING ST. THROUGH ST PAULS COLLEGE
EXISTING ENERGY AUSTRALIA KIOSK LOCATIONS
WESTERN AV
CARILLON AVE
LU SUPPLY & METER POINT
LINK UNDER ROAD.
CITY ROAD
SINGLES RESIDENCE
Staff House
Cash Chapel
Women's College
Maples
Staff Residences
Dining Room
Chapel
Mary Andrews College
LIBRARY AND ADMINISTRATION
Campbell Street Meeting Room
Lecture Dining Hall Complex
LU SUPPLIES TO REAR OF BUILDINGS
CAMPBELL STREET
KING STREET
Car Entry
College Green
Playground
Mail Locker Room
Benjamin Knox Teaching Centre
Malcolm Impact Bookshop
Houses
EXISTING OVERHEAD SUPPLIES BUILDINGS IN KING ST & CARILLON AVENUE
COMMS LINK IS RETICULATED THROUGH EXISTING BUILDINGS & ACROSS COURTYARD
IT DEPARTMENT (COMMS LINK)
TELSTRA NETWORK ACROSS BUILDING FROM STREET.
EXISTING OVERHEAD NETWORK SUPPLIES BUILDINGS IN KING STREET
QUEEN STREET
FORBES PLACE
FORBES STREET
From Newtown
Properties owr
KEY
EXISTING OVERHEAD ELECTRICITY CABLING
EXISTING BELOW GROUND /IN BUILDING CABLING
TELSTRA INFRASTRUCTURE
MOORE COLLEGE COMMUNICATIONS CABLING
PHOTO VIEW
CUNDALL
Project MOORE COLLEGE
Project No. S9045
Title EXISTING SITE ELECTRICAL & COMMS INFRASTRUCTURE
Sketch No. S9045/SK/E01
By DS Date 2.7.09



Overall Concept Plan

Moore Theological College Concept Plan

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Project	MOORE COLLEGE
Project No.	S9045
Title	PROPOSED ELECTRICAL INFRASTRUCTURE - STAGES
Sketch No.	S9045/SK/E02-B
By	DS Date 12.10.09